

TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE</u>
Section 9 Video Distribution System.....	9-1
9.1 Overview	9-1
9.2 General VDS System Recommendations	9-2
9.2.1 IP Recommendations for VDS Systems	9-2
9.2.2 VDS Signal Extenders Recommendations.....	9-2
9.2.3 VDS Peripheral Guidelines.....	9-2
9.2.4 VDS Peripheral Connectors Guidelines.....	9-3
9.2.5 VDS Peripheral Connector Conversion Devices	9-3
9.2.6 VDS Matrix Switch Guidelines	9-3
9.2.7 VDS IA Security Recommendations	9-3
9.2.8 VDS Availability Recommendations.....	9-3
9.2.9 VDS Capacity Recommendations.....	9-4
9.2.10 VDS Diagnostics Recommendations.....	9-4
9.3 Closed VDS System Design Guidelines	9-4
9.4 VDS over IP (VDS-IP) Design Guidelines.....	9-4
9.5 VDS Recording Guidelines.....	9-5

LIST OF FIGURES

<u>FIGURE</u>		<u>PAGE</u>
Figure 9.4-1.	VDS Over IP System	9-5

SECTION 9

VIDEO DISTRIBUTION SYSTEM

9.1 OVERVIEW

The Unified Capabilities (UC) Framework document serves the purpose of design guide and is a complement to the Unified Capabilities Requirements (UCR), which states the specifications that need to be met in order for products to pass the Joint Interoperability Test Command's (JITC's) Approved Products List (APL) certification.

This section addresses Video Distribution System (VDS) specifications and design guidelines. VDS is a compliment of audio and video equipment designed for interfacing, switching/bridging, and distributing digital and/or analog audio, video and picture signals sourced from multiple devices and destined to multiple devices. Unlike a video teleconferencing (VTC) Multipoint Conferencing Unit (MCU), which performs solely many to one audio and video signal bridging, the VDS can perform many to one, one to many and many to many bridging of audio, video and pictures and can distribute signal feeds to geographically dispersed locations and may include Extended Display Identification Data, which is a data structure that provides additional information and intelligence about the feed (e.g., signal feed coordinates, Predator target, etc.).

VDS architectures are composed of subsystems that include the following:

1. VDS Distribution Devices (One to Many). Includes systems that receive signals sourced from one device which are then repeated to multiple destination devices or video displays.
2. VDS Switching Devices (Many to One). Includes systems that receive signals sourced from multiple devices which are then repeated to one destination device or video display. Sources are connected to a common central device that can actively select (switch) between any one of the sourced signals.
3. VDS Matrix Switching Devices (Many to Many). Includes systems that receive signals sourced from multiple devices which are then repeated to multiple destination devices or video displays. Sources are connected to a common central matrix device that can actively select (switch) from any source device(s) to one or multiple destination devices simultaneously without compromising signal quality.
4. VDS Peripherals. Normally devices that enable users to interact with the VDS system. They include the following:
 - a. Source Devices. Computer Workstations, Laptop Computers, Video Playback Devices (DVD, BlueRay, Media-Players), Cable Television Tuners and Live Video Camera Feeds.
 - b. Destination Devices. Desktop Monitors, Television Monitors, Video Projectors, Video Signal Processors, Video Recording Devices, and Video Wall Signal Processor Systems.

5. VDS Peripheral Connectors. These are modular standard components which provide different options for interfacing VDS peripheral devices; they include HD-SDI, DVI, VGA, HDMI, and Component HD.
6. VDS Peripheral Connector Conversion Devices. These are devices that convert between different types of peripheral connector standards (e.g., HDMI to VGA).
7. VDS Cabling. Includes common copper and optical cabling for passing the electrical signals that enable audio and video, from source devices to destination devices.
8. Analog-to-Digital Converter (ADC) and Digital-to-Analog Converter (DAC). These are devices that convert a digital (usually binary) code to an analog signal (current, voltage, or electric charge) and vice versa.

9.2 GENERAL VDS SYSTEM RECOMMENDATIONS

General VDS configuration Recommendations apply to all VDS devices in both the Closed VDS system configuration as described in this section and VDS over Internet protocol (IP) configurations as described in [Section 9.3](#).

9.2.1 IP Recommendations for VDS Systems

If the VDS system is inaccessible from Department of Defense (DoD) IP-routed networks, then the VDS system is considered a “Closed VDS System” and support of the IPv4 profile as defined in Section 7.2.1.5, and of the IPv6 profile as described in Section 5, is optional. Otherwise, if the VDS systems connect to IP-routed networks, then the VDS system is considered a “VDS over IP System” and must support the IPv4 profile as defined in Section 7.2.1.5 and the IPv6 profile as described in Section 5.

9.2.2 VDS Signal Extenders Recommendations

VDS source and destination devices may be physically separated by long geographical distances that exceed the maximum specifications of the original audio and video signal format. In these scenarios, VDS system can utilize signal extenders to convert or condition the original signal for transmission over longer cabling distances.

9.2.3 VDS Peripheral Guidelines

VDS Peripherals fall into one of two categories:

1. Source Devices. These are signal generators which output video, audio and other waveforms that are used in the communication, synchronization of VDS subcomponents. Examples include: Computer Workstations, Laptop Computers, Video Playback Devices (DVD, BlueRay, Media-Players), Cable Television Tuners, and Live Video Camera Feeds.

2. Destination Devices. These are signal receivers which input video, audio and other waveforms that are used in the communication, synchronization of VDS subcomponents and provide the necessary feedback that enables VDS. Examples include: Desktop Monitors, Television Monitors, Video Projectors, Video Signal Processors, Video Recording Devices, and Video Wall Signal Processor Systems.

9.2.4 VDS Peripheral Connectors Guidelines

VDS peripheral connectors are modular components which provide different options for interfacing audio and video interface formats and VDS subcomponents.

9.2.5 VDS Peripheral Connector Conversion Devices

VDS Peripheral Connector Conversion (VPCC) devices are system appliances that operate and provide gateway like capabilities and allow for different types of VDS subcomponents to interoperate by coupling unlike peripherals.

9.2.6 VDS Matrix Switch Guidelines

VDS systems connect via a VDS Matrix Switch, which is a device capable of accepting multiple inputs from source devices and selectively distributing any one of these inputs to one or many destination devices.

9.2.7 VDS IA Security Recommendations

VDS components must adhere to the appropriate STIGs, Ports, Protocols, and Services Management (PPSM) guidelines to achieve compliance for all information systems, applications, and services connected to the Global Information Grid (GIG). VDS systems must also meet all appropriate Information Assurance and Vulnerability Assessment (IAVA) and National Institute of Standards and Technology (NIST)/National Information Assurance Partnership (NIAP) standards.

9.2.8 VDS Availability Recommendations

Availability refers to the ability for the users to access the system, ensuring a prearranged level of operational performance, during a pre-determined contractual measurement period. Generally, the term downtime is used to refer to periods when a system is unavailable.

It is recommended for VDS equipment to operate 24x7 with the exception of scheduled maintenance.

9.2.9 VDS Capacity Recommendations

All VDS audio/visual (A/V) solutions must allow the user to add inputs independently of adding outputs. Similarly, the VDS solution must allow end users to add outputs independently of inputs.

NOTE: This flexibility provides system expansion to add additional sources (inputs) as mission Recommendations increase, without the addition of more outputs, thus reducing the cost of system expansion and providing a matrix which can support a system with more inputs than outputs or more outputs than inputs.

The VDS switch matrix should allow for a non-squared expansion capability on inputs and outputs by installing additional plug-in input cards, output cards, matrix cards, small form factor pluggable modules, and power supplies without disrupting existing signal paths. Best practices indicate that expansion in a non-squared (addition of sources/destination (X-Inputs/Y-Outputs)) affords the user the most economical approach to VDS switch matrix expansion thus lowering total life cycle costs.

9.2.10 VDS Diagnostics Recommendations

System diagnostics verify and validate proper system operation and system status information.

9.3 CLOSED VDS SYSTEM DESIGN GUIDELINES

By definition, Closed VDS systems do not interface with the DISN core. A Closed VDS System is considered to be a traditional VDS that enables video distribution over a Time Division Multiplexing (TDM)-based network and can from time to time support IP capabilities in a closed environment. Closed VDS systems leverages legacy standards and traditional TDM VDS. By definition, the UCR stipulates that Closed VDS systems are inaccessible from DoD IP routed networks.

A Closed VDS System is considered to be a traditional VDS that enables SMPTE signals to be transmitted over a digital infrastructure. In the context of the UCR and the UCF, a Closed VDS System enables video distribution over non IP-based networks, but can from time to time support IP capabilities in a closed environment. Closed VDS systems can leverage legacy standards and by definition, the UCR stipulates that Closed VDS Systems are inaccessible from DoD IP-routed networks. It is important to note however, that a Closed VDS system may use a peripheral device to extract video from an IP transport and covert it to a SMTP digital data stream, and passed through the VDS.

9.4 VDS OVER IP (VDS-IP) DESIGN GUIDELINES

By definition, VDS Over IP systems interface with the DISN core. [Figure 9.4-1](#) depicts how a traditional VDS system becomes a VDS over IP (VDS-IP) system. A VDS-IP is an extension of

traditional VDS that enables added features such as enhanced compression procedures that allow for very low latency distribution over an IP transport. VDS-IP leverages standards based Moving Picture Compression Algorithm (MPCA) and/or Picture Compression Algorithm (PCA) to enable performance driven features and advantages over traditional TDM VDS. This approach allows for VDS-IP systems to extend and reach across networking infrastructures where TDM based and Closed VDS systems have physical and architectural limitations. By definition, the UCR stipulates that VDS-IP systems are accessible from and interface with DoD IP routed networks.

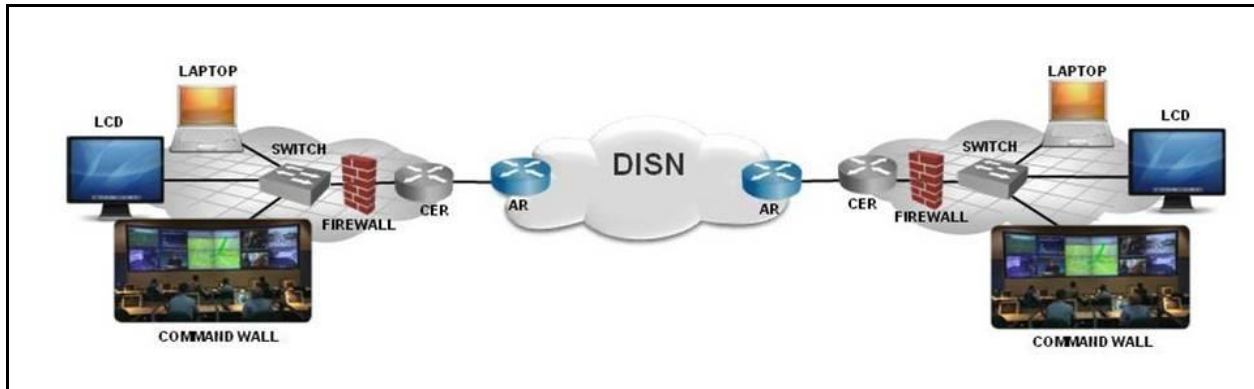


Figure 9.4-1. VDS Over IP System

9.5 VDS RECORDING GUIDELINES

VDS recording relates to the capturing and archiving of video and audio, analog or digital signals that are stored for later retrieval in optical disc recording technologies (e.g., DVD, CDs) Magnetic Storage (e.g., Hard drives), Flash Memory (e.g., Memory Cards, USB Flash Drives, Solid State Drives) or Magnetic tape (e.g., Video Tape, Compact Cassette).

VDS Recording Devices fall into one of two categories:

- Video Tape Recording (VTR). Is a device that captures and archives video and/or audio material on a magnetic tape (e.g., Video Tape, Compact Cassette).
- Digital Video Recorder (DVR). Is a device or application software that captures and archives video and/or audio in a digital format to a disk drive, USB flash drive, SD memory card, or other local or networked mass storage device.